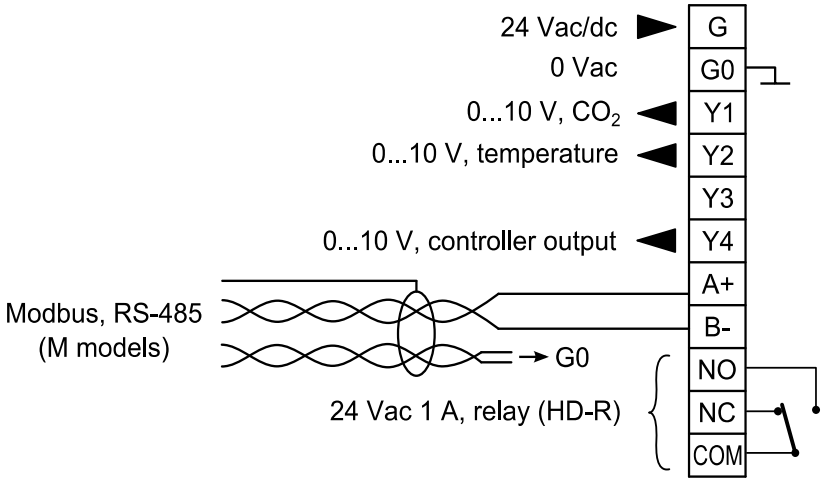
MOUNTING

Wiring

Caution

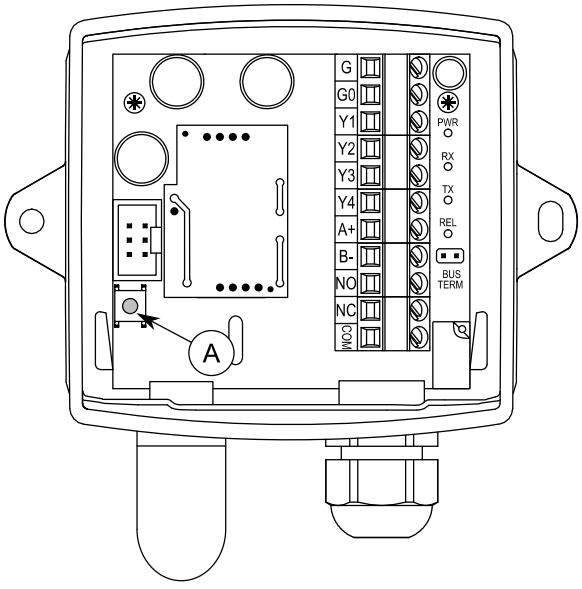
Device wiring and commissioning can only be carried out by qualified professionals. Always make the wirings while the power is switched off.



SELECTING THE MEASUREMENT INFORMATION TO BE VIEWED ON THE DISPLAY

The measurement values scroll on the N model display. The wanted value can be locked to view continuously by pressing the S1 button. You resume to the scrolling view by pressing the S1 button again.

NOTE: When the temperature drops below 0 °C the display may fade slightly. In these situations it's recommended to lock the display to show one measurement value. This improves the display readability.



A. S1 button

NOTE: In M models, the shown measurement information can be selected also via Modbus.

ABCLogic™ SELF CALIBRATION FEATURE

ABCLogic™ (Automatic Background Calibration Logic) is a patented self-calibration technique. ABCLogic™ method eliminates the possible long term drift. ABCLogic™ method can be used when the CO_2 concentration drops at least two times within a week to the level of approx. 400 ppm. Therefore the ABCLogic™ is effective in spaces that are not continuously occupied.

ABCLogic™ can be deactivated in continuously occupied spaces.

Deactivating the ABCLogic™

The ABCLogic™ function can be deactivated by using the ML-SER tool.

CALIBRATION

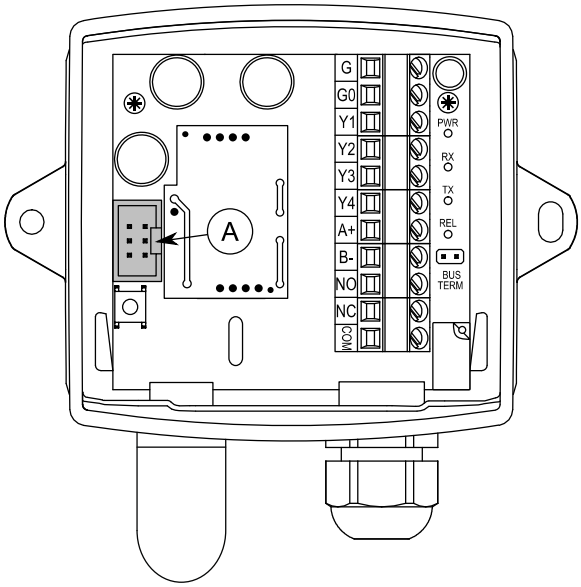
If ABCLogic™ method is not in use, the device should be calibrated every 6-12 months. The recommended calibration interval is 5 years even if the ABCLogic™ is in use.

ML-SER TOOL

With the ML-SER tool you can change the device settings, controller and Modbus settings for example.

Connecting ML-SER tool to the device

1. Disconnect the display cable.
2. Connect the ML-SER cable to the connector.



A. ML-SER cable connector

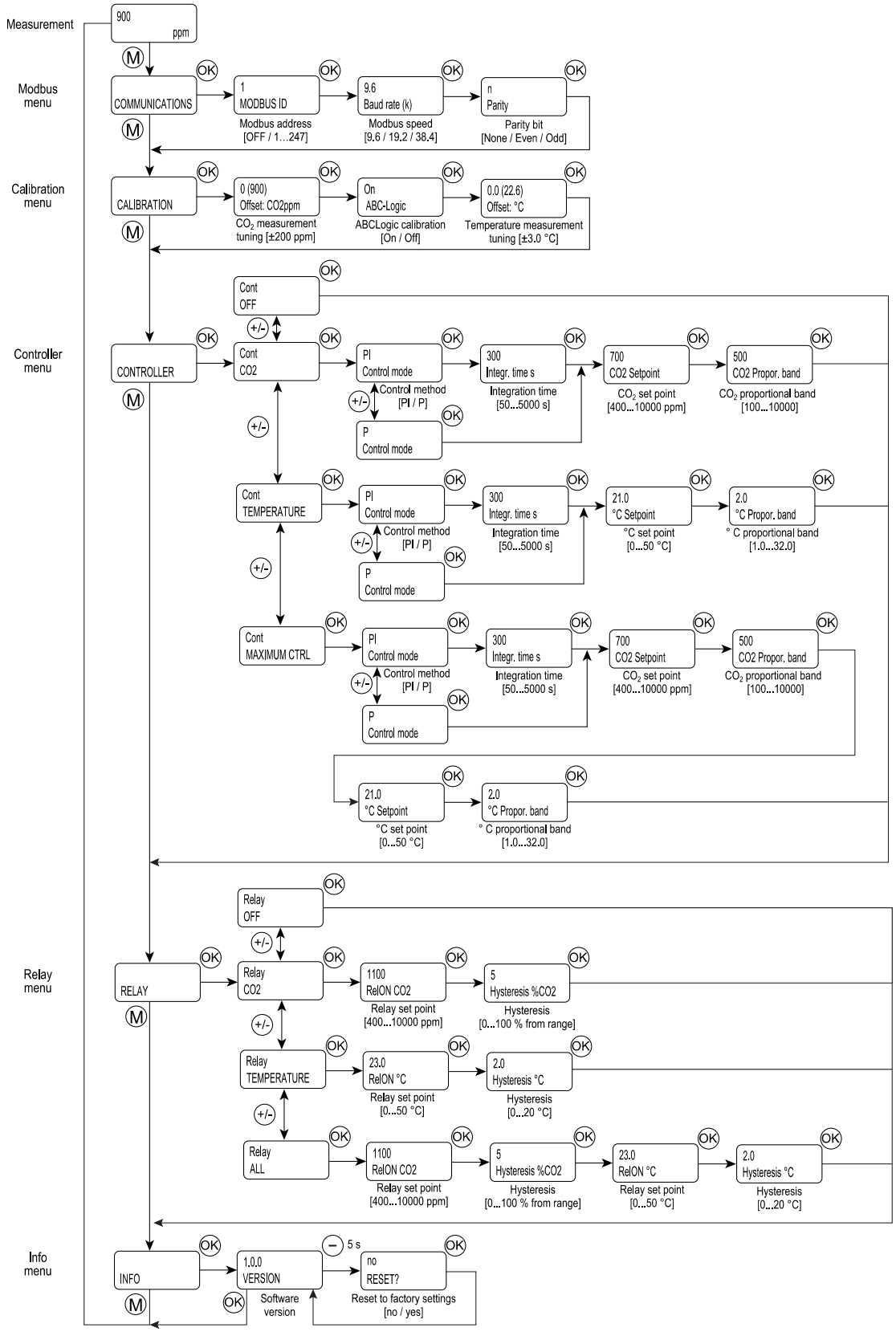
CO_2 measurement value shows on the ML-SER tool display.

ML-SER menu

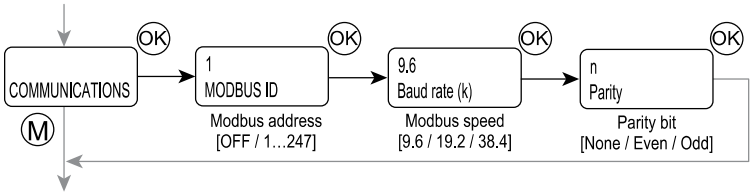
ML-SER menu opens by pressing the M button. The values can be changed with the ”+” and ”-” buttons. The menu is device-specific and the content depends on the device and installed options.

The following menu structure contains the factory settings.

NOTE: The default relay CO_2 set point is 2500 ppm in 5K models.

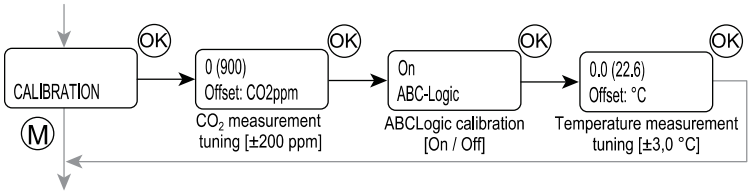


Modbus menu



Modbus menu is available in M models. The bus settings can be changed through the menu.

Calibration menu

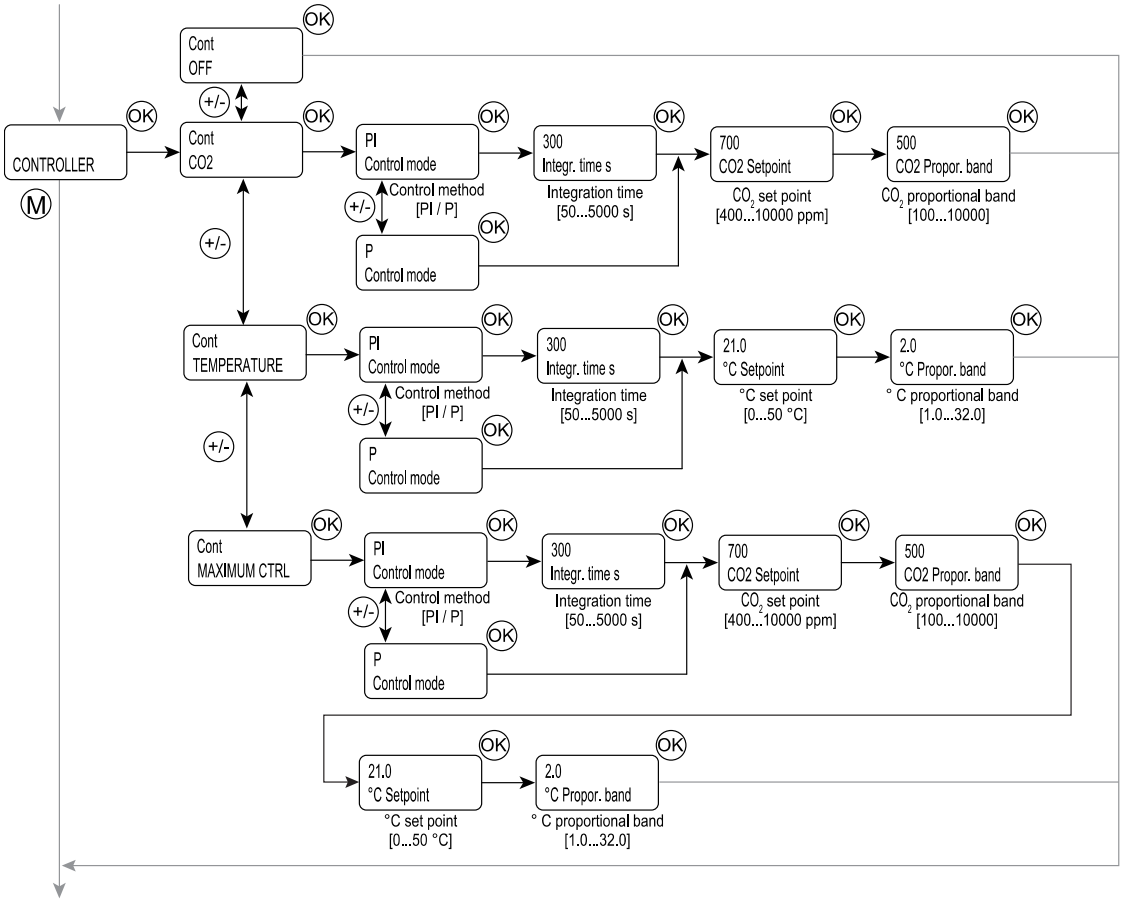


All the measurements can be tuned through the calibration menu.

- The CO_2 value can be adjusted by 10 ppm steps.
- The temperature value can be adjusted by 0.1 °C steps.

ML-SER tool display shows how much the current value is tuned. The measured value is shown in brackets after the tuning value.

Controller menu

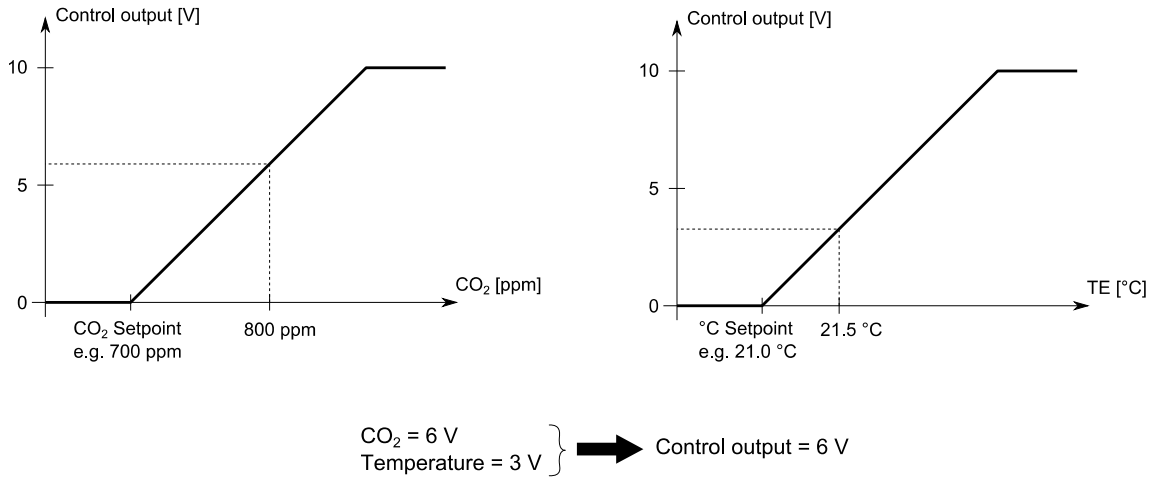


The control output can be controlled either according to a one measurement value or according to the maximum selection of all values.

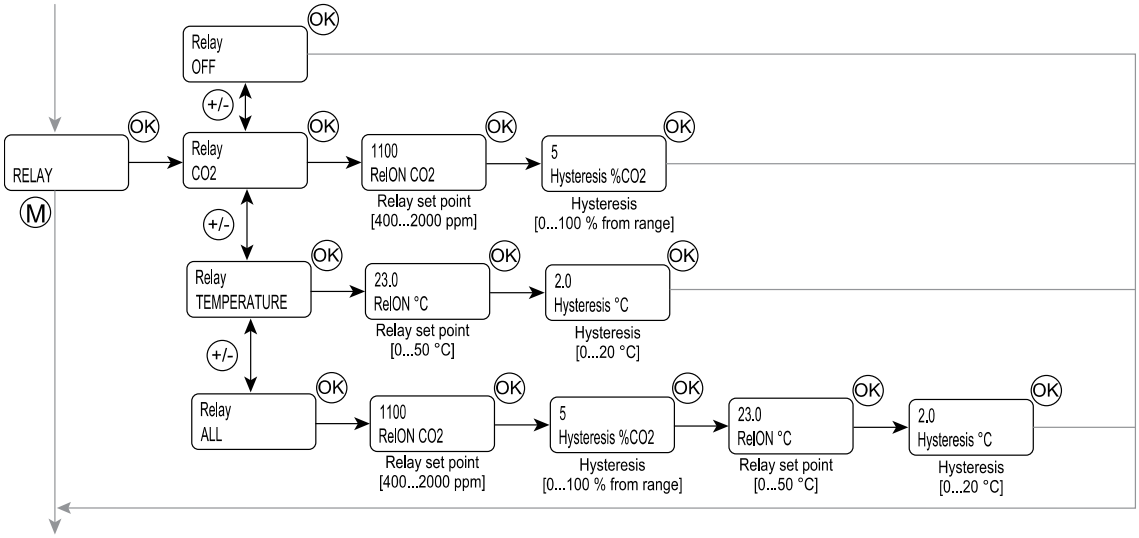
- The CO_2 values can be adjusted by 10 ppm steps.
- The temperature values can be adjusted by 0.1 °C steps.

In the maximum selection control, the control output signal is formed according to the measurement that causes the largest control signal value. The following situation is described in the example figure:

- Carbon dioxide concentration is 800 ppm
- Temperature is 21.5 °C



Relay menu



Relay menu is available if HD-R option is installed. The relay switching point and hysteresis can be changed through the menu.

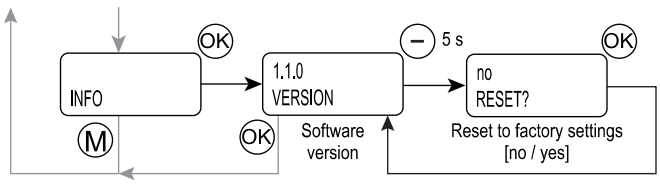
NOTE: The default relay CO_2 set point is 2500 ppm in 5K models.

The relay output can be controlled either according to a one measurement value or according to the all values.

- The CO_2 values can be adjusted by 10 ppm steps.
- The temperature values can be adjusted by 0.1 °C steps.

When the output is controlled according to the all values, the relay activates when one measured value exceeds the set point.

Info menu



You can check the device software version and reset the device to factory settings through the Info menu.

MODBUS

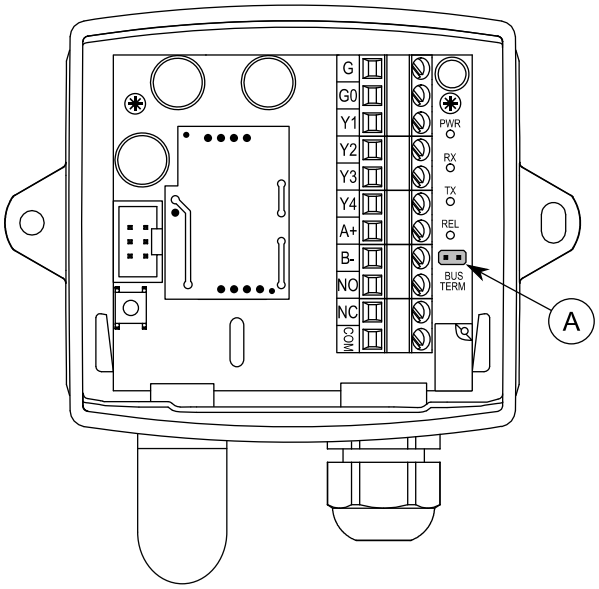
Bus properties

Protocol	RS-485 Modbus RTU
Bus speed	9600/19200/38400 bps
Data bits	8
Parity	none/odd/even
Stop bits	1
Network size	up to 128 devices per segment

The parameter memory durability allows at least 1 million write cycles.

Bus termination

The Modbus can be terminated by placing the BUS TERM jumper.



A. BUS TERM jumper

Modbus function codes

The device supports the following Modbus function codes.

0x01	Read Coils
0x02	Read Discrete Inputs
0x03	Read Holding Registers
0x04	Read Input Registers
0x05	Write Single Coil
0x06	Write Single Register
0x0F	Write Multiple Coils
0x10	Write Multiple Registers
0x17	Read/Write Multiple Registers

Modbus registers

NOTE: If you try to write a parameter value that is beyond the parameter value range, the value will be replaced by the nearest acceptable value.

Example:

1. The register value range is -500…500.
2. You try to write the value 600 to the register.

   -> the value 500 is written to the register.

Coils

Register	Parameter description	Data type	Values	Range	Default
1	Y1 output overdrive activation	Bit	0 - 1	0: Off, 1: On	0
2	Y2 output overdrive activation	Bit	0 - 1	0: Off, 1: On	0
3	Y3 output overdrive activation	Bit	0 - 1	0: Off, 1: On	0
4	Y4 output overdrive activation	Bit	0 - 1	0: Off, 1: On	0
5	Relay overdrive activation	Bit	0 - 1	0: Off, 1: On	0
6	Relay overdrive	Bit	0 - 1	0: Off, 1: On	0

Discrete inputs

Register	Parameter description	Data type	Values	Range
1000**1**	Relay status	Bit	0 - 1	0: Off, 1: On

Input registers

Register	Parameter description	Data type	Values	Range
3000**1**	CO_2 measurement	Signed 16	400…10000	400….10000 ppm
3000**2**	Temperature measurement	Signed 16	0…500	0.0…50.0 °C
3000**3**	Not in use	Signed 16	-	-
3000**4**	Y1 output voltage	Unsigned 16	0…1000	0.00…10.00 V
3000**5**	Y2 output voltage	Unsigned 16	0…1000	0.00…10.00 V
3000**6**	Y3 output voltage	Unsigned 16	0…1000	0.00…10.00 V
3000**7**	Y4 output voltage	Unsigned 16	0…1000	0.00…10.00 V

Holding registers

Register	Parameter description	Data type	Values	Range	Default
4000**1**	Y1 output overdrive	Signed 16	0…1000	0…10.00 V	0
4000**2**	Y2 output overdrive	Signed 16	0…1000	0…10.00 V	0
4000**3**	Y3 output overdrive	Signed 16	0…1000	0…10.00 V	0
4000**4**	Y4 output overdrive	Signed 16	0…1000	0…10.00 V	0
4000**5**	CO_2 measurement tuning (offset)	Signed 16	-200…200	-200…200 ppm	0
4000**6**	Temperature measurement tuning (offset)	Signed 16	-30…30	-3.0…3.0 °C	0
4000**7**	Not in use	Signed 16	-	-	0
4000**8**	Control method	Signed 16	0 - 1	0: P 1: PI	1
4000**9**	Controller output	Signed 16	0 - 1 - 2 - 3 - 4	0: off 1: CO_2 2: temperature 3: not in use 4: maximum selection	1
4001**0**	Set point, CO_2	Signed 16	400…10000	400….10000 ppm	700

Register	Parameter description	Data type	Values	Range	Default
400**11**	Set point, temperature	Signed 16	0…500	0.0…50.0 °C	210
400**12**	Not in use	Signed 16	-	-	50
400**13**	Proportional band, CO_2	Signed 16	100…10000	100….10000 ppm	500
400**14**	Proportional band, temperature	Signed 16	10…320	1.0…32.0 °C	20
400**15**	Not in use	Signed 16	-	-	50
400**16**	Integration time	Signed 16	50…5000	50…5000 s	300
400**17**	Relay set point, CO_2	Signed 16	400…10000	400….10000 ppm	1100 *)
400**18**	Relay hysteresis, CO_2	Signed 16	0…100	0…100 %	5
400**19**	Value shown on the display	Signed 16	0 - 1 - 2 - 3	0: CO_2 1: temperature 2: not in use 3: scrolling	3
400**20**	Not in use	Signed 16	-	-	1
400**21**	Not in use	Signed 16	-	-	0
400**22**	Relay set point, temperature	Signed 16	0…500	0.0…50.0 °C	230
400**23**	Relay set point hysteresis, temperature	Signed 16	0…200	0.0…20.0 °C	20
400**24**	Not in use	Signed 16	-	-	50
400**25**	Not in use	Signed 16	-	-	5
400**26**	Relay function	Signed 16	0 - 1 - 2 - 3 - 4	0: off 1: CO_2 2: temperature 3: not in use 4: all	1

*) The default relay CO_2 set point is 2500 ppm in 5K models.